REMARKS

Claims 1-3, 5, 6, and 8 are presently pending in the application.

Claims 1 and 2 have been amended to incorporate subject matter from claims 4 and 7, now canceled, and to recite that the amount of sulfated ashes derived from metal elements is in an amount of 0.3 to 0.6 percent by mass, which is supported in the specification at least in paragraph [0069]. Claim 2 has also been rewritten in independent form by incorporating some subject matter from claim 1. Finally, claim 6 has been amended to add the word "to" which was omitted in error. No new matter has been added by these amendments, and entry is respectfully requested.

At the outset, Applicants note that the Examiner has only examined claims 1-5 and has not examined claims 6-8. However, since claims 6-8 are identical to claims 3-5 but depend from claim 2 rather than from claim 1, Applicants assume that claims 6-8 would have been rejected for the same reasons as claims 3-5.

In the Office Action, the Examiner has objected to claim 2 as being of improper dependent form, arguing that the amount of component (C) in claim 2 is greater than the amount recited in claim 1. Applicants note that, as described in the specification in paragraph [0048], the amount of zinc secondary alkyldithiophosphate component (C) can be decreased by adding component (E). Nevertheless, claim 2 has been rewritten in independent form, and reconsideration and withdrawal of the objection are respectfully requested.

The Presently Claimed Invention and 132 Declaration

The presently claimed invention is directed to a lubricating oil composition for an internal combustion engine, specifically, a low ash content-type diesel engine oil suitable for use in a diesel engine equipped with an exhaust gas after-treatment device. It is known in the art (see Background of the present application) that some engine oils tend to shorten the life of the exhaust gas after-treatment device. For example, when using oils containing ZnDTP, which is generally added as an anti-wear agent, zinc oxides or zinc phosphates derived from ZnDTP accumulate on the catalyst surface or filter during combustion and thus impair the purifying performance of the device. Therefore, it has been desirable to add no ZnDTP to the oil or to keep the amount thereof in the oil as low as possible. It is also known that metallic detergents cause similar problems to those resulting from ZnDTP.

However, due to mixing in of soot and contaminating oils, particularly in diesel engines equipped with an EGR, reducing or eliminating ZnDTP and/or metallic detergents increases the wear of the valves and deteriorates the detergency of the oil for the pistons. Therefore, it has been desirable to provide a low ash-content type engine oil which exhibits enhanced anti-wear properties and high temperature detergency even when the amounts of ZnDTP and/or metallic detergents are reduced.

Applicants have discovered that such an engine oil may be obtained by adding component (D), i.e., amine salts of phosphoric acid esters and/or amine salts of phosphorus acid esters (as recited in claim 1) or by adding these amine salts in combination with component (E), i.e., a fatty acid amine (as recited in claim 2) to an engine oil which comprises a base oil, (A) a succinimide-based ashless dispersant, (B) a metallic detergent, and (C) ZnDTP, and by adjusting the sulfated ash content of the oil to 0.3 to 0.6 percent by mass.

In order to further demonstrate the advantageous effects observed by the claimed lubricating oil composition, Applicants have performed additional comparative experiments. These experiments are described in a Declaration Under 37 C.F.R. § 1.132 of Isao Kurihara ("Kurihara Declaration"), submitted herewith. As set forth in the Kurihara Declaration, three comparative oils (Reference Examples 1-3) were prepared by the method described at page 30, line 17 to page 32, line 12 of the specification. The components of each of the Reference Example oils are summarized in Table A of the Kurihara Declaration, which also includes the details of the Inventive Example 2, 6, and 7 compositions for comparison. All of the compositions (Reference Examples 1-3 and Inventive Examples 2, 6, and 7) have a sulfated ash content of 0.56 to 0.59 mass %, within the claimed range. However, while the compositions of the Inventive Examples contain an amine salt of phosphite as a phosphorus-containing ashless anti-wear agent as claimed, the compositions of the Reference Examples contain only phosphite as a phosphorus-containing anti-wear agent.

As shown in Table A of the Kurihara Declaration, the sample oils of Reference Examples 1-3 were inferior to the claimed oils of Inventive Examples 2, 6, and 7, respectively, in anti-wear properties and high temperature detergency evaluated by the high-velocity four-ball wear test and the hot tube test. These test results demonstrate that the nature of the phosphorus-containing ashless anti-wear agent indeed has an effect on both the anti-wear properties and high

temperature detergency of the lubricating oil compositions. That is, such properties are improved by including an amine salt of phosphite rather than phosphite, for example.

Rejection Under § 103(a) Based on Nakazato

The Examiner has rejected claims 1-5 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,569,818 of Nakazato et al. ("Nakazato"). The Examiner argues that Nakazato teaches a lubricating oil composition having a low phosphorus content of 0.01 to 0.1 weight % and a sulfated ash content of 0.1 to 1 weight %, which is comprised of: (a) a minor amount of mineral based oil having a low sulfur content of at most 0.1 weight %, (b) an ashless alkenyl or alkyl-succinimide dispersant or derivative thereof in an amount of 0.01 to 0.3 weight % in terms of nitrogen atom content, (c) a metal-containing detergent such as an overbased alkaline earth metal salt of an alkylsalicylic acid in an amount of about 0.2 to 7 weight %, (d) a zinc dialkyl-dithiophosphate in an amount of 0.01 to 0.1 weight % in terms of phosphorus content, and (e) an alkaline inhibitor. Nakazato allegedly teaches that the lubricating oil composition may be used in internal combustion engines, such as diesel engines equipped with exhaust gas after-treatment systems. The Examiner notes that the "comprising" language of the present claims allows for the addition of other additives, and argues that Nakazato teaches that the lubricating oil compositions may contain other auxiliary additives, such as phosphoric acid esters, phosphorus acid esters, and organic amide compounds such as oleylamide, which may be incorporated in amounts of 0.001 to 3 weight %. The Examiner thus concludes that the present claims are obvious over Nakazato. Applicants respectfully traverse this rejection as follows.

Nakazato describes a lubricating oil composition which comprises: (a) a mineral base oil, (b) an ashless succinimide dispersant, (c) a metal-containing detergent, and (d) ZnDTP. Nakazato further teaches that the composition may contain phosphoric acid esters, phosphorus acid esters, and organic amide compounds, such as oleylamide.

However, Nakazato does not teach or suggest that the composition may contain the claimed amine salts as phosphorus-containing ashless anti-wear agents, i.e., component (D), and thus does not teach or suggest all of the claimed elements. As demonstrated in the Kurihara Declaration and discussed above, the inclusion of an amine salt of a phosphoric acid ester or of a phosphorus acid ester in the lubricating oil composition provides improved anti-wear properties and high temperature detergency, despite the low ash content. Since Nakazato does not teach or

suggest amine salts of phosphoric acid ester or of phosphoric acid ester, such advantageous results would not have been expected based on Nakazato. Accordingly, even if a *prima facie* case of obviousness had been established based on Nakazato, the unexpected and advantageous results exhibited by the presently claimed composition would overcome such a case. Reconsideration and withdrawal of the § 103(a) rejection are respectfully requested.

Rejection Under § 103(a) Based on Yagishita in view of Nakazato

The Examiner has also rejected claims 1-5 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,306,801 of Yagishita ("Yagishita") in view of Nakazato. The Examiner argues that Yagishita discloses a lubricating oil composition suitable for use as a diesel engine oil which comprises a major amount of a lubricating base oil selected from mineral and synthetic oils and, as additives, (A) 0.5 to 20% by mass of acylated bissuccinimide, (B) 0.05 to 0.3 % by mass of zinc dithiophosphate in terms of phosphorus, and (C) 0.5 to 4.0% by mass of metallic detergent in terms of the sulfated ash content, based on the total mass of the composition. Yagishita allegedly teaches that the metallic detergent may be an overbased alkaline earth metal salicylate having a total base number of 100 to 450 mg KOH/g. The Examiner acknowledges that Yagishita does not teach or suggest adding a phosphorus-containing ashless antiwear agent or a fatty acid amide to the lubricating oil compositions. However, the Examiner argues that Yagishita allows for the addition of known additives to the compositions, including antiwear additives. As described above, Nakazato allegedly teaches that the lubricating oil compositions, which are suitable for use as diesel engine oils, may contain other auxiliary additives, such as phosphoric acid esters, phosphorus acid esters and organic amide compounds, such as oleylamide, in amounts ranging from 0.001 to 3 weight %. The Examiner thus concludes that it would have been obvious to add any conventional engine oil additives, such as those taught by Nakazato, to the lubricating oil compositions of Yagishita if the known imparted properties were so desired. Applicants respectfully traverse this rejection as follows.

As acknowledged by the Examiner, Yagishita does not teach or suggest the inclusion of a phosphorus-containing ashless anti-wear agent. Further, as explained above, Nakazato does not teach or suggest the claimed amine salt of phosphoric acid ester or of phosphorus acid ester, and

thus even the proposed combination of Nakazato with Yagishita would not teach or suggest all of the claimed elements. Furthermore, the advantageous effects exhibited by the presently claimed composition would not have been expected based on the proposed combination of references.

Additionally, Yagishita discloses a lubricating oil composition containing (B) 0.05 to 0.3 mass % of ZnDTP in terms of phosphorus content, and (C) 0.5 to 4.0 % by mass of metallic detergent in terms of the sulfated ash content, based on the total mass of the composition. The sulfate ash content of the Yagishita composition is thus at least 0.624% mass % (total of the sulfated ash content (P) derived from ZnDTP and that of the metallic detergent), which exceeds the upper limit (0.6 mass %) of the claimed range of the sulfated ash content. Yagishita thus does not teach or suggest the claimed sulfated ash content, nor would there have been any motivation to reduce the sulfated ash content of Yagishita to obtain a low ash content composition as claimed. For these reasons, even the proposed combination of Yagishita and Nakazato would not result in the presently claimed invention and reconsideration and withdrawal of the § 103(a) rejection are respectfully requested.

Based on the preceding Amendments, Remarks, and Kurihara Declaration, it is respectfully submitted that the pending claims are patentably distinct from the prior art of record and in condition for allowance. A Notice of Allowance is respectfully requested.

Respectfully submitted,
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August 2, 2007 By: for William H. Schwarze Reg. No. 25,918
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Enclosure: Declaration Under 37 C.F.R. § 1.132 of Isao Kurihara
Petition for Extension of Time (one-month)